Successful Methods

Construction - Road Making - Engineering - Industrial - Mining

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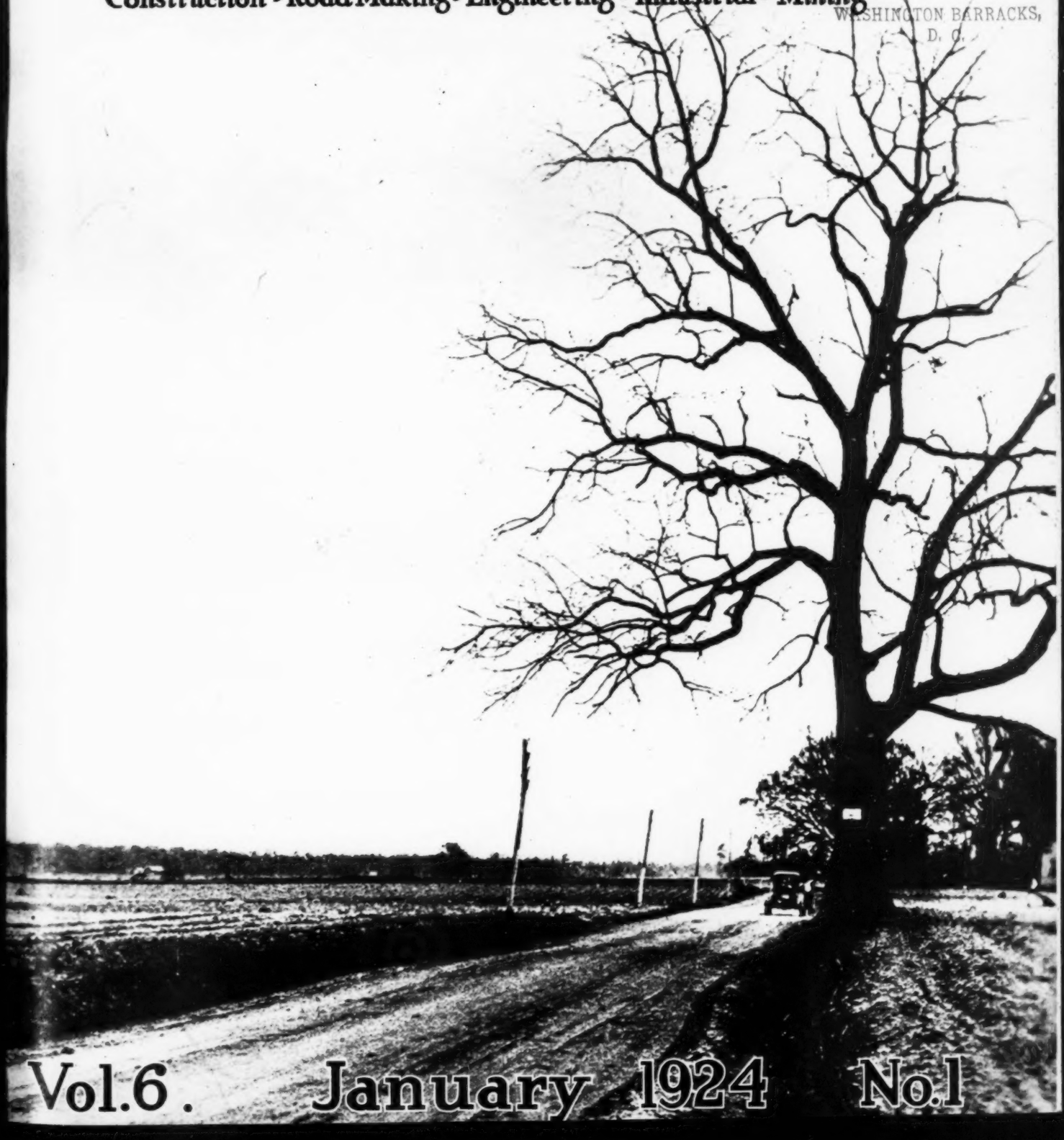
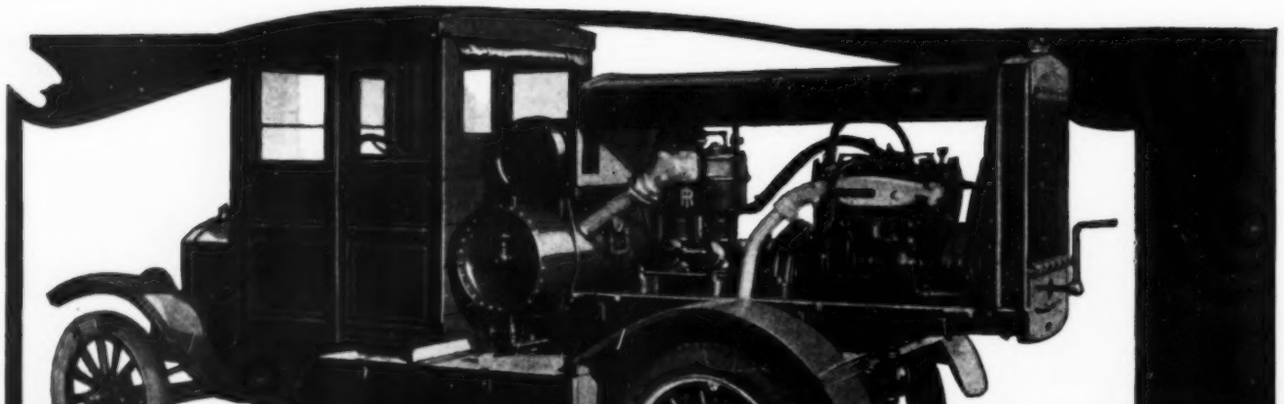
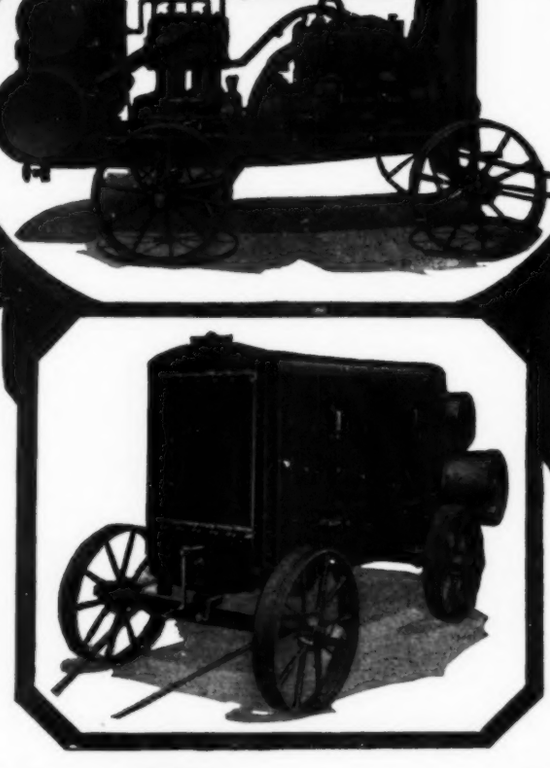


Vol.6. January 1924 No.1

Portable Air Service

MAKE YOUR AIR WHERE YOU USE IT





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Successful Methods

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Five Billion Dollars a Year

ONE of the largest investment bond houses in the country recently estimated that more than five billion of dollars were required for the construction work done in the United States in 1923. Figures like these do not mean much to most of us. But anyone can grasp the fact that the year just passed was a record breaker in most kinds of new work in all parts of the country.

Present prospects are that the 1924 construction figures will considerably exceed last year's record. It is true that an election year usually slows things up a bit. Europe also evidently will continue to stew in the juice of international hates and fears, with the resulting chaos. Material prices here are high, and unit labor costs are excessive. There are various other conditions which in the past would have caused investors to hesitate to put money into new work. In the face of this general situation, confidence in the business future of the country appears to be unlimited. Following the minor slump of late last summer in contracts let and in building permits issued, there has been a big upturn. Plans already announced for large new projects in all parts of the country indicate that the upturn will continue. In traveling anywhere around the country and in reading country newspapers from any section, it also is evident that small jobs and farm building work—both of which are rarely given much consideration in nation-wide construction figures—are on the increase. Highway construction will evidently go ahead this year on a scale surpassing even the almost unbelievable total expended in 1923.

There appears to be no question about 1924 being a big construction year. Whether the total reached for the year will exceed the immense figure of five billions of dollars estimated for 1923 remains to be seen. Apparently nothing short of a totally unexpected catastrophe can prevent the volume of new work started in the first few months of 1924 from exceeding the records made in the same period last year.

This situation will present wonderful opportunities for properly organized concerns to make good profits. With it will come problems, however, which will call for the keenest kind of judgment in bidding planning and handling work. Experience will be more valuable than ever before, but it must not prevent the adoption of new methods to meet the changed conditions.

Buying Ahead

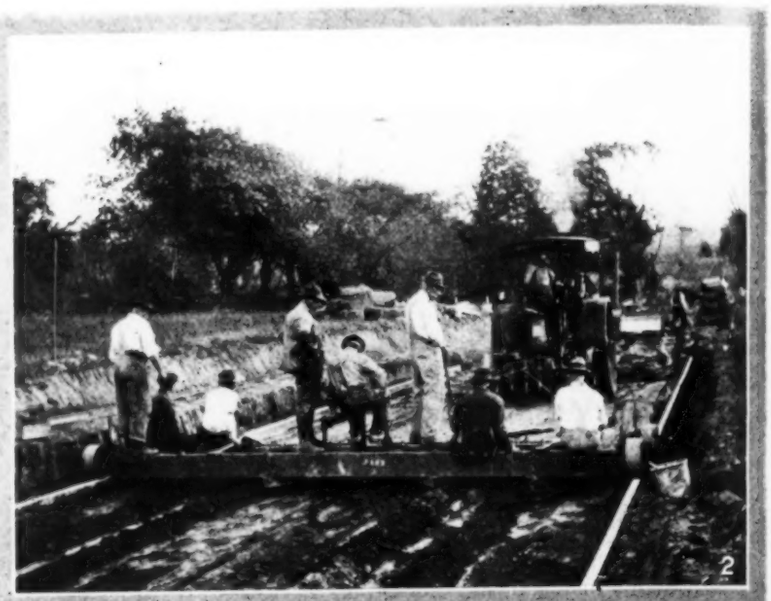
ALL signs point to a jam in material and equipment delivery this coming spring such as has rarely been experienced. In fact, the outlook now is that for a few weeks just before hot weather starts, prompt delivery of materials in many localities will be obtained on new orders only by paying a stiff premium. Many manufacturers of the better kind of construction equipment also evidently will be sold out far in advance.

This situation has been anticipated by equipment purchasing for forward delivery to an extent never previously known. For example, one steam shovel manufacturer had in December booked orders for spring delivery that totalled almost two months' capacity of his factory. This is by no means an exceptional case. All the makers of high-grade equipment have booked an unprecedented volume of forward delivery business. As a result, most of them are running full time now when their factory operations usually slack off more or less seriously. This means they will produce a larger total number of machines in the year, but it will not help the fellow who waits until the last minute and then wants delivery yesterday.

A line on the amount of materials that have been bought for delivery later is not so easy to get. Reports from various sources indicate that far more than the usual number of orders for material to be delivered in the spring and early summer already have been placed. Several instances also have been located where materials are being delivered now for work that will not start for some time.

The idea of buying materials and equipment ahead has only recently been practised to any extent in the construction industry. This seems strange to men experienced in other lines of industry, such as the steel mill business where great volumes of materials are delivered and stored far in advance of current requirements. But the construction industry as a whole has only recently begun to find itself as a real business. And one of the evidences of this is the fact that buying for forward delivery is being done on an increasing scale throughout the country. The outstanding feature of this tendency is that buying for forward delivery is done almost entirely by concerns which have been successfully managed.

Road Construction



1—Building a concrete road in Illinois.
2—Preparing the subgrade with the assistance of the entire gang, all of whom wanted to get in the picture and insisted on taking a ride on the subgrader.
3—A finished hard-surface highway in Oregon.

And Maintenance

4—A light roller working on a road in a private estate.
5—An important feature of maintenance work. Clearing the snow off a northern highway.
6—Resurfacing a bituminous macadam road that has begun to show the strain of heavy traffic.

A FOOT OF CONCRETE ROAD A MINUTE

Careful Planning to Eliminate Delays Makes Record Speed Possible on New Jersey Highway Job

THE twenty-third day of last August the State Highway Commission of New Jersey awarded the Public Service Production Company of Newark, N. J., a contract to build 4.44 miles of 20-ft. reinforced concrete road paving having a uniform thickness of 8 in.

MATERIAL YARD SHOWING CEMENT COVERED WITH CANVAS

Four months later to the day the job was completed, paid for and the contractors plant removed. But sixty-nine days elapsed from the actual start of the work until its completion. Only fifty-six days elapsed from the beginning of operations to the completion of the concrete work, and the 4.44 miles of 20-ft. pavement were laid in forty actual working days.

These records were made possible by the manner in which the job was planned, and by keeping all of the operations continually in step. T. J. Wasser, civil engineer for the Public Service Production Company, was in responsible charge of the work. He handled it on the basis that actual construction was secondary to the transportation of material. The construction plant was selected and operated with proper care, but a steady flow of materials to the mixer was

EXCAVATOR WORKING ON SHOULDERS

LOADING BIN CRANE PICKING UP GRAVEL FROM STOCKPILE

the feature on which the whole organization concentrated.

Materials were delivered by rail at both ends of the job, the haul from the delivery points to the site of the work averaging about a mile. The scheme of handling at the two mile delivery points was practically the same. It provided at both points that a minimum of four days' supply of cement, sand and gravel should be available, the aim being to keep six days' supply of sand and gravel ahead. The cement was delivered so that a good deal more than that was always on hand.

The sand and gravel were unloaded at each delivery point by a full circle swing crane equipped with a 40-ft. boom and handling a ¾-yd. clamshell bucket. The crane delivered to stock piles or to an elevated steel batch hopper. This hopper had sufficient capacity to keep the job going two hours in case of a shutdown of the crane.

The cement also was delivered by rail. Tight wooden platforms were built up alongside the railroad switch to the box car floor level. These platforms were made of lumber dressed smooth on one side and laid so as to give a smooth surface for hand truck operations. No sheds were built over the platforms, the only protection of the cement being obtained by means of tarpaulins. At one time a large quantity of cement was stored in this way, as is shown in one of the photographs, without any loss or damage.

Two of the latest type 21-E concrete paving mixers were used. One outfit started at one end of the job and the second midway on the job, both working in the same direction. As the pavement replaced an old gravel surface on a heavily traveled road, the specifications required that a 10-ft. strip of the pavement be built the entire length of the job without detouring traffic. When the first strip was finished, traffic was turned over it and the second 10-ft. strip was built.

The materials were delivered from both rail points to the mixers in trucks, each carrying two batches proportioned at the hoppers. Eleven trucks were provided. In the beginning, four were assigned to the mixer that started about a mile from the rail delivery point. The other seven trucks served the second mixer beginning with a maximum haul of three miles. As the haul to the first mixer increased and the haul to the second mixer was reduced, the trucks were shifted until at the finish of the first 10-ft. strip, seven trucks were serving the first mixer and four trucks were serving the second one.

The operation of the trucks was organized as the controlling factor in the amount of concrete that could be laid. Schedules accordingly were made so as to avoid any interruption in the delivery of materials to the mixers. A careful study showed that each truck had to stay at the mixer about four minutes. In order to keep things moving smoothly, the drivers were required to stay four minutes at the loading hopper. They rarely needed this much time merely to load, but by having them take care of minor truck upkeep in the interval delays on the road were almost entirely eliminated.

The trucks also were operated with the old idea of the experienced dirt mover that the main unit in the plant must never wait. This was applied by having an idle truck always waiting at the mixer.

MIXER AT WORK ON FIRST 10-FOOT STRIP

If a truck from the hopper failed to show up on time the idle truck immediately took its place. This cut out all delay at the mixer and kept the whole crew constantly on its toes. The subgrade was of such material that the trucks cut it up considerably if it was unprotected. This difficulty was easily overcome by placing a heavy layer of salt hay on the subgrade ahead of the mixer. In fact, with no more protection than this, the trucks were able to back right up to the mixer without delay and without cutting the subgrade.

THE FINISHED STRIP OF CONCRETE SHOWING ROUGH SHOULDER CONSTRUCTION

Based on his extensive experience in various capacities, including that as State Highway Engineer of New Jersey, Mr. Wasser is convinced that the gap between the batch hopper and the mixer is where most delay occurs on concrete road jobs that are otherwise well planned and well organized. Stock piles and batch hoppers can take up any ordinary interruptions at the rail delivery end. Good mixers turn out concrete at a uniform rate on the job. Time lost due to hauling delays between the hopper and the mixer cannot, however, be recovered. Mr. Wasser proved on this job that by cutting out any chance for such hauling delays it was possible to mix and place concrete at high rates day after day. In fact, the record of the job shows that the 10-ft. strips were laid at an average rate of 1 ft. per minute.

The records obtained were made possible only by the keenest sort of cooperation between the contractor's organization and the representatives of the State Highway Commission. In fact, the team work between the two was, according to Mr. Wasser, one of the principal reasons for the completion of the entire job in the very short time required.

ROAD BUILDERS GET MORE SPACE FOR SHOW

FINAL plans have been completed for the Twenty-first Annual Convention and the Fifteenth National Road Show of the American Road Builders' Association which will be held in Chicago Jan. 14 to 18. The attendance at the convention and Show is expected to surpass that of last year when nearly 6000 registered. All who expect to attend this year's convention are urged to write at once to the American Road Builders' Association at the Congress Hotel, Chicago, and obtain blanks for advance registration. By so doing, they will avoid all delays when they reach Chicago and will receive in advance the card which will admit them to the Road Show without charge during the entire week.

As was the case last year, the convention will be held at the Congress Hotel beginning Tuesday, Jan. 15, and as has already been announced, a special feature will be the joint session with the Associated General Contractors on Thursday, Jan. 17.

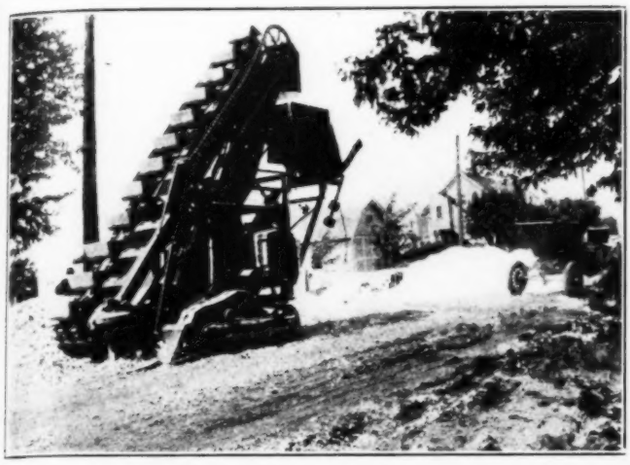
Applications for space at the road show were so numerous that C. M. Upham Convention and Show Manager was forced to provide additional room. It was intended to use only the Coliseum, the Coliseum Annex and the Greer Building, but arrangements have been made whereby the Wilson Bldg. has been added to the show floor space.

FRANK PAGE,
PRESIDENT AMERICAN ROAD BUILDERS' ASSOCIATION

JAMES H. MacDONALD
TREASURER AMERICAN ROAD BUILDERS' ASSOCIATION

MACHINES CUT LABOR COSTS ON ALLEY PAVING

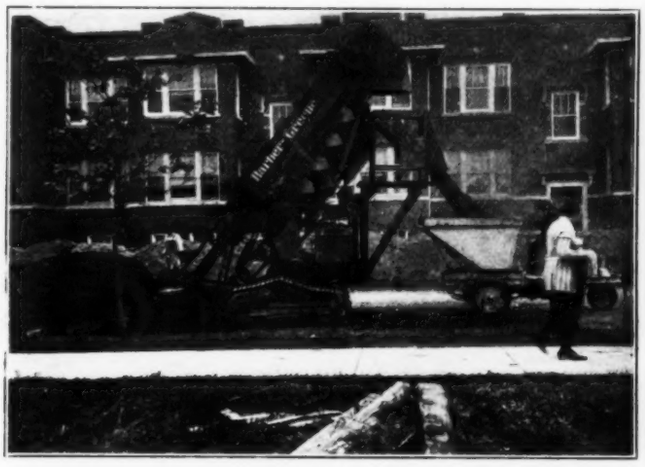
Contractor Uses Bucket Loaders and Small Tractors to Supply Mixer



READY TO LOAD

THE work of paving the alleys which bisect Chicago blocks is being handled by R. R. Anderson, a contractor of that city, with two bucket loaders. He has found that by dumping his stone and sand in the street close to the alley and then using his bucket loaders to fill small three-wheel tractors with dump bodies which transport the materials to the mixer, he saves about 6 men on the stone handling and 4 on the sand.

Mr. Anderson has been trying out this method for some time and has found it thoroughly successful. The elimination of approximately 10 men is, of course,



LOADING

his big point, but in addition the use of the machines means a steadier and more dependable method of supply than is the case when the hand labor is employed.

The reduction in the number of units crossing the sidewalk also has speeded up the work.

AGGREGATES PILED IN STREETS SHOWING LOADERS AT WORK

THE DEVELOPMENT OF A STATE HIGHWAY SYSTEM

Roads Must Be Built to Serve Public Every Day in the Year

By Charles M. Upham
State Highway Engineer of North Carolina

THE development of a state highway system may be measured by the extent that it affects the economical, civil and social life of the individuals of a state. The standard of living of the individuals depends on the modes and development of transportation and the transportation depends on the road service that is furnished to the public by the highway commission.

ONE DEMONSTRATION OF THE NEED OF A STATE HIGHWAY SYSTEM

The development of a state highway system does not necessarily mean only the construction of hard surface roads, for it has been plainly demonstrated where the road program has been carried on in this manner that the value of the state highway system has been reduced. The State as a whole has not been served.

ANOTHER GOOD REASON FOR STATEWIDE DEVELOPMENT OF ROADS

The development of a state highway system *does* mean road service to the public 365 days in the year and this road service may be brought about by the construction and maintenance of the highest types of hard surface roads, or it may be in merely the grading of some earth road; it might possibly be in the construction of the highest type of bridge, or it may be in the construction of a rough timber bridge.

Whatever may constitute the road service, it should be conducted on an economical basis, taking into consideration the cost of the improvement and the returns received on the investment; the reduction in

KEEPING A NORTH CAROLINA ROAD IN SHAPE FOR TRAFFIC 365 DAYS IN THE YEAR

the cost of hauling and the increase in the amount of hauling; the time element that is saved; the added value to property and all other increments that follow in communities where road service in the form of good roads has brought about progressive development.

MAINTENANCE GANG ON THE JOB

In certain localities of this country the industries and commerce have developed with rapid strides. In most cases the early roads which were constructed in these localities were utterly broken down when automobile trucks began to be such a factor in transportation.

Of course, it is quite evident that in order to furnish road service in these localities that hard surface construction must immediately take place. This construction must be based on the highest standards as determined by research and investigation. There are, however, vast localities, many times greater than these developed areas, that have not as yet reached the state of progress that demands or can afford, hard-surfaced roads. The problem of furnishing to these undeveloped localities the road service, which should be the aim of all state highway systems, is more of a complicated problem than merely the construction of hard surface roads.

The problem of developing a state highway system, or of furnishing road service to communities, is very different in different States; varying in accordance with the state of development and natural resources of the particular locality considered.

I think it is safe to state that nearly as much money has been wasted in the construction of road types that are stronger than necessary, as the amount of money that has been wasted in the construction of roads that were not strong enough to meet traffic requirements. In other words, there are numerous examples where States have spent $40,000 per mile in roadway construction, where an $8,000 per mile roadway would have sufficed for many years. The same expenditure made for the higher type road per mile would have constructed 5 miles of satisfactory road and furnished five times the amount of road service to the public and provided for a state development in five times as many places.

The problem of any transportation system is correctly answered in proportion to the amount of service that it renders the public, and the progress and prosperity of the communities of the State is in direct proportion to transportation service rendered the community. The development of any locality or State comprises many problems and practically every one

THIS MODERN BRIDGE REPLACED A WORN OUT AND INADEQUATE STRUCTURE

of the problems contain the variable factor of transportation. In the construction of large buildings, or the building of roads, or in the every-day life of all professions, the problem of transportation is one of the most important governing factors. One of the reasons why the early development of this country was difficult was because of the lack of transportation facilities. The only means of transportation available at that time were the water fronts, rivers and lakes. As the country developed, community roads were constructed, later these were pushed forward into the country and the immediate localities developed. As the localities developed the roads pushed further on and these localities were connected and the broader road system brought about general development.

About 1830, railroads began to be constructed and with this transportation service there followed an extensive development of the States and entire country. With this means of transportation the country enjoyed an extensive development and progressed rapidly. The construction of railroads reached its peak about 1885 and it may be said that this extensive development of the country was approached at that time. Since that time the intensive development of the States has taken place and this has been brought about and expedited by the new means of auto transportation.

TYPICAL HIGHWAY BUILT BY THE STATE

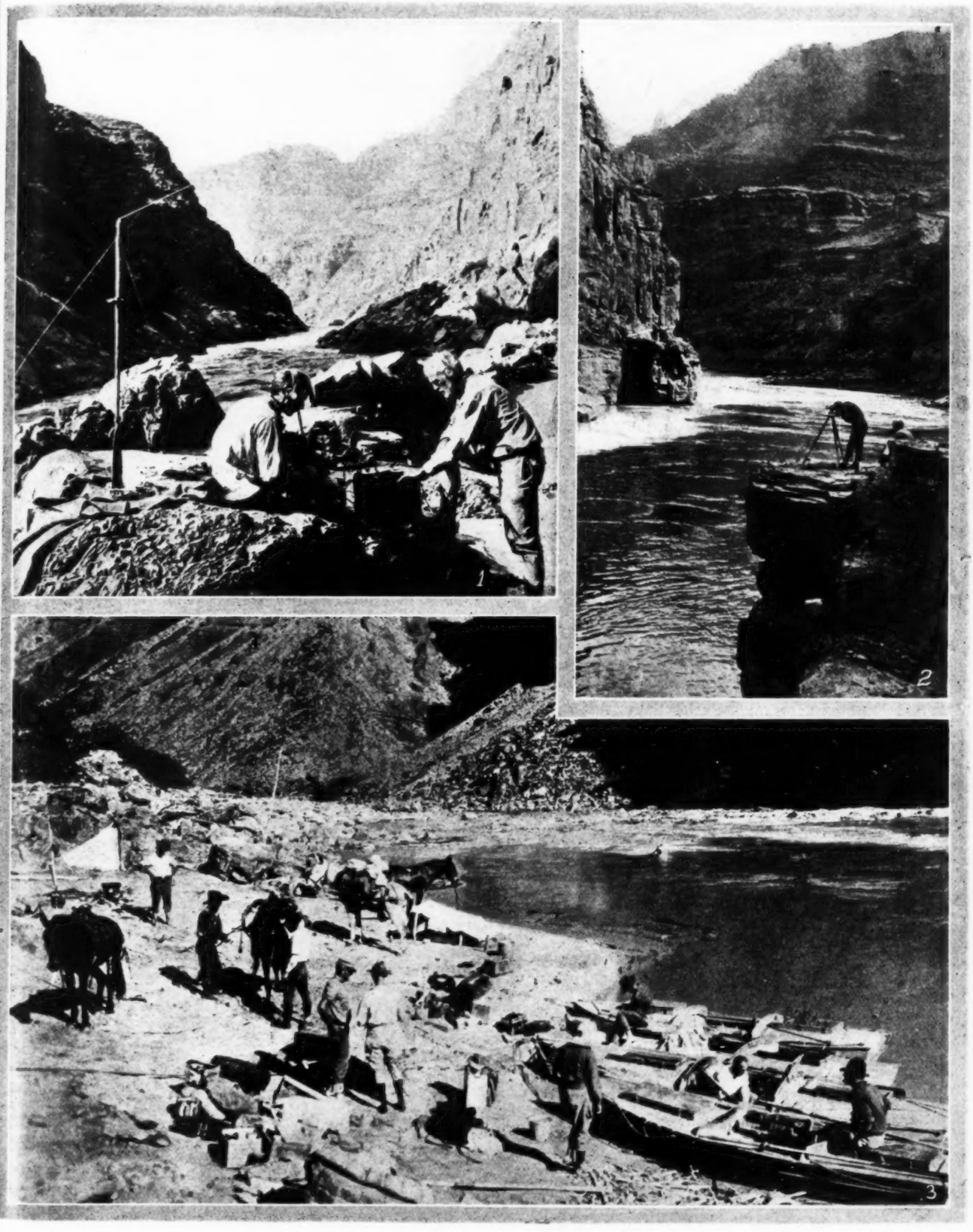
In constructing a state highway system, the first thing that is to be done is to make a survey to determine the needs of transportation. This survey should also include the general topography of the State, also the areas of the various activities and whether these activities are commercial, agricultural, industrial or whether the area is given over to tourist traffic. The survey should also show the location and population of all towns and cities. It should also estimate the development of the country as to whether it will be industrial, commercial, agricultural or otherwise. A careful survey of the present traffic and also an estimate of the future traffic should be made, basing the estimate on all information available in regard to this detail. This information should be studied carefully.

In the laying out of a state highway system careful consideration should be given to the development of a community, the amount of money that it can economically afford to invest in road service and returns from this investment. In the thickly populated districts where commerce and industry have already taken the lead, it is evident that the highest type of road should be constructed, but in localities where traffic is light, a lower type of road would furnish the road service that is demanded. In the locality where development has not yet taken place, the construction of progressive roads should be undertaken. All progressive type or development roads, of course, should be laid out on the same line and grade standards as for hard surface roads and construction should be of the most modern method, and as a country, or community develop, these roads can be added to until the final result is a high type of hard surface road. There are certain localities where it is very evident that these development roads will never be called upon to serve as trunk lines; in such cases the roads should be constructed in such a manner that a lower type road will at all times suffice. In other localities it may be seen at a glance that roads that are now secondary roads and little used will at some time become trunk lines. Of course, in the construction of these roads the standards used must be all hard surface standards, even though the first construction may be only to grade the road and build the drainage structures. By following the hard surface standards, no step in the construction is lost, for every successive step utilizes the preceding work.

With the development of every state highway system there are the individual problems of location, construction, maintenance and operation. In the location of roads many factors must be taken into consideration and the road so located that traffic, although moving at a speed of 25, 40 or even 50 miles per hour, will be in no danger.

(To be concluded in the February issue)

Surveying the Grand Canyon



These three photographs show the work of surveying the Grand Canyon of the Colorado, which was completed recently after a hazardous journey. Photograph No. 1 shows Col. C. H. Birdseye in charge of the party using the radio set which was carried throughout the journey and which warned the party of impending floods, of which they otherwise could have had no word. No. 2 shows the surveying party at work on a rocky point in the Canyon. No. 3 was taken at the head of Hance Rapid where the entire party was preparing for a portage around the rapid © International.

CASTING AND HANDLING HEAVY PIPE

Big 15-Ton Sections Are Moved by Crane Mounted on Motor Truck

THE casting of concrete pipe on a large scale is being conducted by the Western Concrete Pipe Co. of Los Angeles, which is supplying the cement pipe units for the Bellona Creek Project. Thousands of pipe sections reinforced with steel and lined with vitrified tile are being cast in four different yards at the rate of 72 sections a day. These sections vary in size from the 63-in. size, which weighs 5 tons, to the big 102-in. size, which weighs 15 tons.

TRANSFERRING SAND FROM CAR TO STOCKPILE

The forms for casting the pipe are set up on end and a movable mixing plant proceeds from one yard to the other and takes care of the actual work of casting. It has a small tower and chute which enables it to pour the concrete directly into the forms.

Materials are supplied from a storage yard, where the aggregates are unloaded from cars by a portable crane which then fills an overhead bin which takes care of the small dump trucks which haul the materials to the mixer wherever it may be.

After the pipe has had a chance to set, it is necessary to turn each section over on its side. This work is handled by the same crane which unloads the aggregates. Before the crane went on the job, it took three men approximately half an hour to tip over one section of pipe, but the crane now performs the same operation in 60 sec., only two men being needed. It takes care of all four yards, although they are a mile or two from each other.

The operation of tipping over the pipe is performed by hooking the crane on one side with a sling. Although the crane has a rated capacity of only 4 tons at a 10-ft. radius, it handled 75-in. pipe weighing 7 tons without difficulty. On the 102-in. sections, which, as stated before, weighed 15 tons, it was found advisable to put a timber brace under the head of the boom. Lately, however, by driving the crane close to the pipe, it has been found possible to tip over the big sections without using the brace.

As soon as the sections are on their sides the movable form ring at the end is removed by the crane and is then ready for use on another section.

The speed with which the crane moved from one yard to another and back to the storage yard when necessary has made it an invaluable piece of equipment on this particular job, where thousands of big pipe units have to be turned out without delay.

This entire job is an excellent example of the results which can be attained by the use of mobile equip-

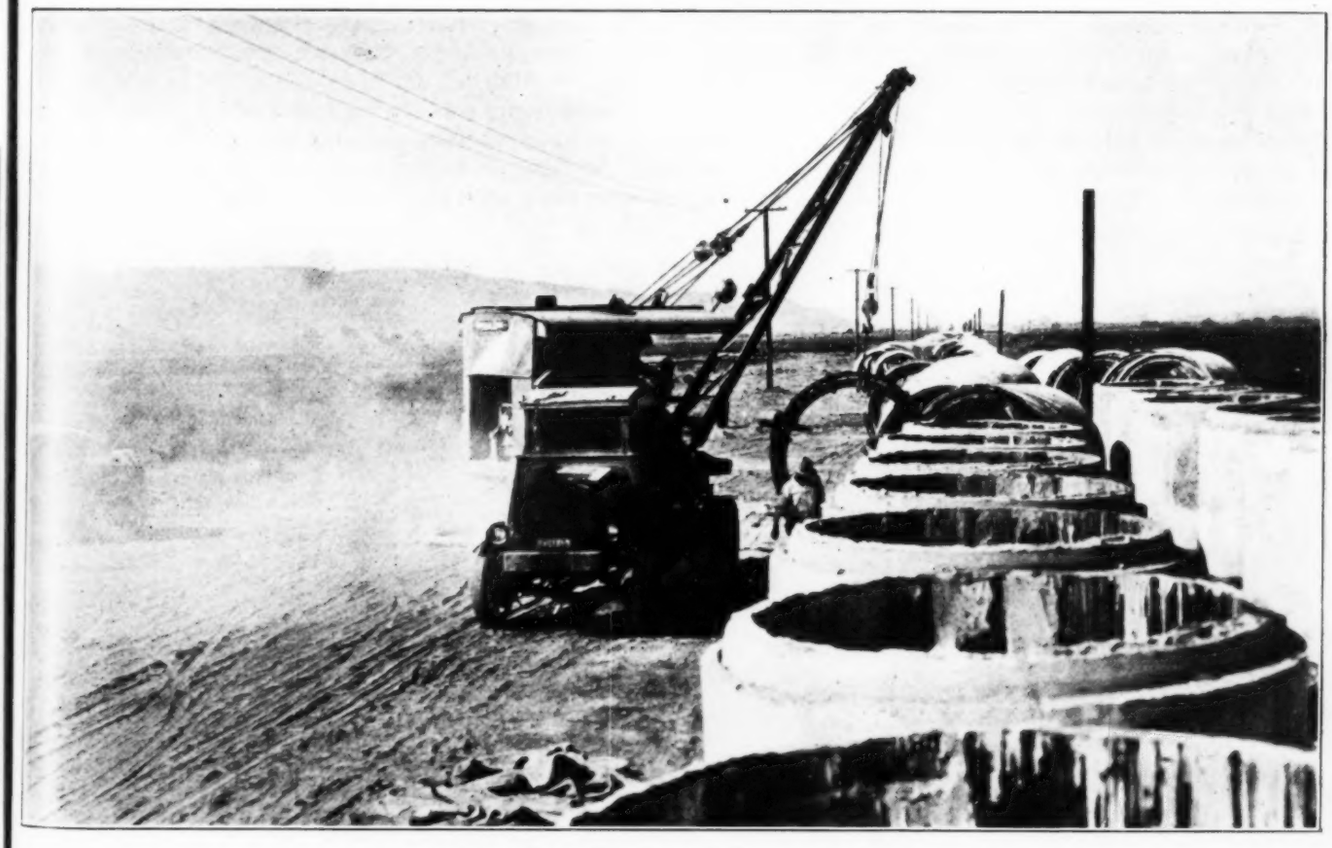
LOADING TRUCKS DIRECTLY FROM STOCKPILE. THIS WAS DONE ONLY AS AN EMERGENCY MEASURE WHEN BIN WAS EMPTY

ment. As has been pointed out before, the four yards are far enough apart so that they might almost be regarded as separate units. Instead of so regarding them, however, the Western Concrete Pipe Company has welded them into one unit and thereby has saved the expense of equipping each of them with a full complement of mixers, material handling machinery, etc.

The portable mixer is cleverly devised and is mounted on a truck with small wheels. It can be hauled from one yard to another by a tractor or a heavy motor truck without difficulty. The tower is about 25 ft. in height and about 25 ft. of chute are used for pouring the concrete into the forms. The skip is so arranged that the small trucks can dump directly into it wherever the mixer may be and the problem of keeping the mixer constantly supplied with material resolves itself into putting the requisite number of trucks on the job.

TIPPING OVER 15-TON SECTION OF PIPE. BOOM OF CRANE BRACED BY TIMBER

The crane, which has been referred to before, fitted exactly into the company's plan for making the four yards a single unit. Its motor truck mounting enabled it to proceed from one yard to another at motor truck speed instead of spending a good share of its time on the road. This extra mobility also enabled it to take care of the work of unloading the material as has been described earlier in this article. The use of one machine for such a variety of duties is unusual and a good proof of the care with which the Western Concrete Pipe Company worked out its plan for this big job.



CRANE HANDLING HEAVY SECTIONS OF PIPE

SAND-CLAY AND TOP SOIL ROADS

South Carolina Builds Them in Rural Sections at Moderate Cost

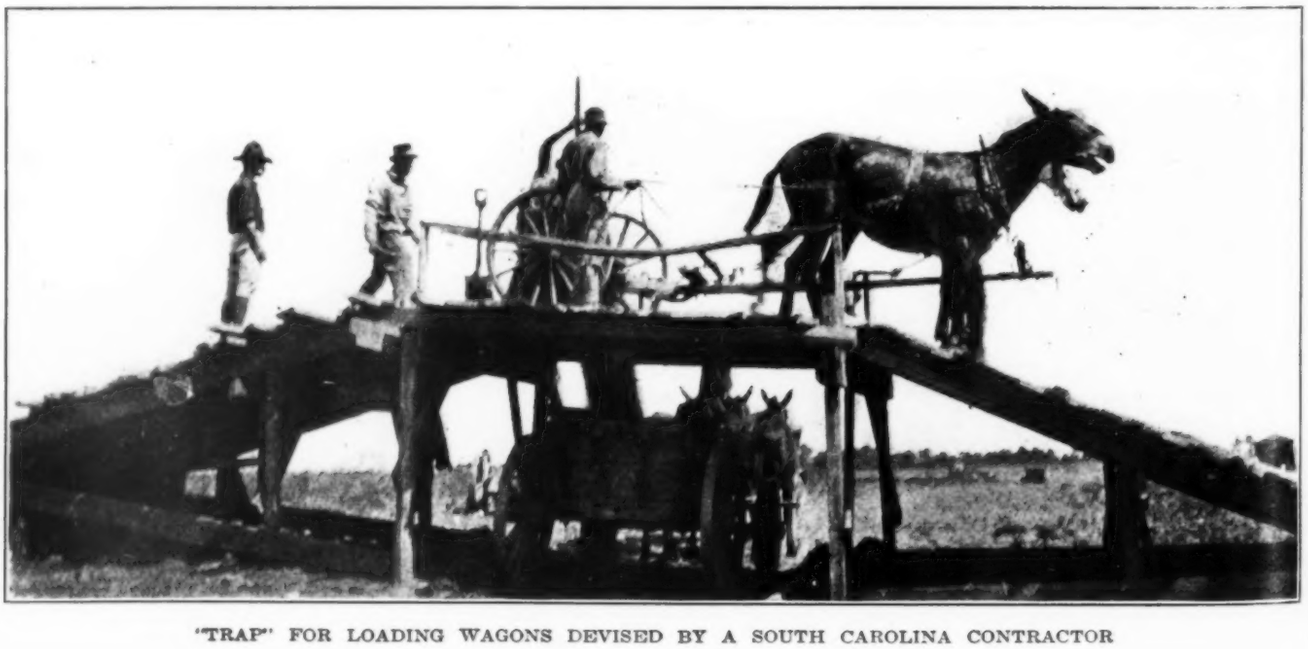
BY C. P. BURTON

THE road-building program of South Carolina includes a large mileage of sand-clay and top soil roads, which are adapted to the needs of the State until such time as the traffic warrants more permanent construction. They cost only about $5,000 a mile and can be resurfaced at a cost of about $1,500.

There is a distinction between sand-clay and top soil roads, although the surface material in each case is practically the same. Top-soil roads are built where top soil in adjacent fields is found to contain the required mixture of sand and clay for surfacing. Where this natural mixture is not found, the sand and clay are placed separately. Each material is first tested mechanically to determine the proportions of the mixture, 70 per cent of clay with 30 per cent of sand for a binder being used. The clay is spread over the full width of the road and on that surface the proper proportion of sand is placed. The road is then plowed, harrowed, and worked with road machines until mixed. The surfacing is put on to a depth of 12 in., about 2460 cu. yd. to the mile. When the road is completed and crowned there is about 10 in. of surfacing.

Standard construction requires a width of 28 ft. on fills, 34 ft. between ditch lines through cuts, 20 ft. of surfacing, and ditches 1 ft. in depth with a slope of 1 ft. in 4 and a 1 to 6 slope at the farther bank. The material from the ditches is used in forming 3-ft. shoulders. The maximum crown is about 4 in.

Wherever top soil can be found which contains the right mixture of sand and clay, roads of this type are built instead of placing sand and clay separately and mixing them afterwards. The top soil is taken from



"TRAP" FOR LOADING WAGONS DEVISED BY A SOUTH CAROLINA CONTRACTOR

WHEELED SCRAPERS ON THE JOB

some field as close to the work as possible, the farmer usually being allowed $5 an acre, which is supposed to be the cost of bringing the patch of land back to fertility.

Before surfacing, the road is graded in the usual way, small sections of the ditch being left to be pulled up as shoulders for holding the top-soil surfacing, which is put on 12 in. thick at the center. Cross-sections of the standard roads show a surface of top soil 20 ft. wide between the shoulders. In practice, however, the top soil often "feathered out" at the edges until the surface drive is from 23 to 24 ft. wide.

Ordinarily this surfacing is done with wheeled scrapers, whether top soil is used or sand and clay are placed separately. A Charleston contractor, who had difficulty finding the right kind of top soil close at hand, made the haul of a mile and a half which was necessary in 1½-yd. dump wagons. To facilitate the work he built a "trap" in a field near his borrow pit, through which he trapped the material into the wagons, handling it with wheeled scrapers in the usual way. Railroad contractors who have gone into road work will appreciate this Charleston man's comment. "Building roads," he says, "is like an Irishman fighting a wildcat. The trouble is to get loose." And he isn't the only one who feels that way about it.

HIGHWAY PROGRESS NEVER STOPS

INDIANA has just issued a new map of its highway system, which it is distributing throughout the State. The work which has been going on during the road-building season which has just ended has made it possible to relocate a number of the through routes and these have all been re-numbered on the new map. These maps have been sent to all Indiana newspapers, hotels, and to a great number of garages scattered throughout the State. Copies of the map are distributed free upon application to the State Highway Department of Indiana.

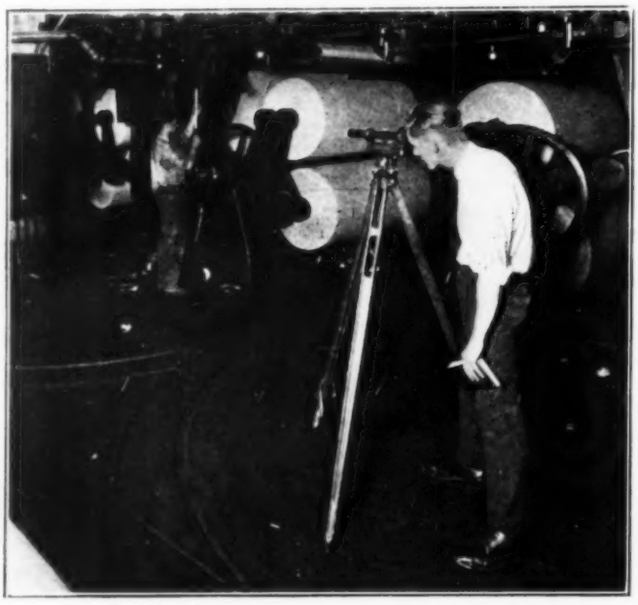
Iowa has begun a campaign to get rid of misleading advertising signs along its highways which, by the use of such words as "Stop," "Danger," etc., attempt to call the attention of motorists to roadhouses, garages, etc. The State Highway Commission regards such signs as a menace to the users of the highway and is systematically removing them.

Pennsylvania has been collecting statistics in regard to the number of accidents on its highways and these statistics tend to show that accidents are less numerous, comparatively speaking, where traffic is heaviest. The greatest number of accidents occurred in District No. 7, which consists of Chester, Delaware, Philadelphia, Montgomery and Bucks counties, but as only 30 accidents occurred in this district out of 225 reported from the entire State, and this district carries one-third of the motor traffic of Pennsylvania, it is evident that where the traffic is heavy travelers use greater care. The city streets of Philadelphia were not included in this compilation. Nearly half the reported accidents occurred on straight roads.

BIG PRESSES COMPLICATE FOUNDATION CONSTRUCTION

Extra Precautions Necessary on Substructure of Chicago Tribune's New Building Which Will Rise to Height of 450 Feet

IN preparing the foundation for the new building that is being erected for the Chicago *Tribune*, one great difficulty encountered has been to keep the presses level and in alignment while work was going on beneath them. The makers of the big presses had advised before operations were commenced that the slightest variation through settlement or movement would put the presses out of operation. The long, flowing ribbon of paper would clog or tear and the presses would have to be shut down.



KEEPING A WATCHFUL EYE ON THE PRESSES

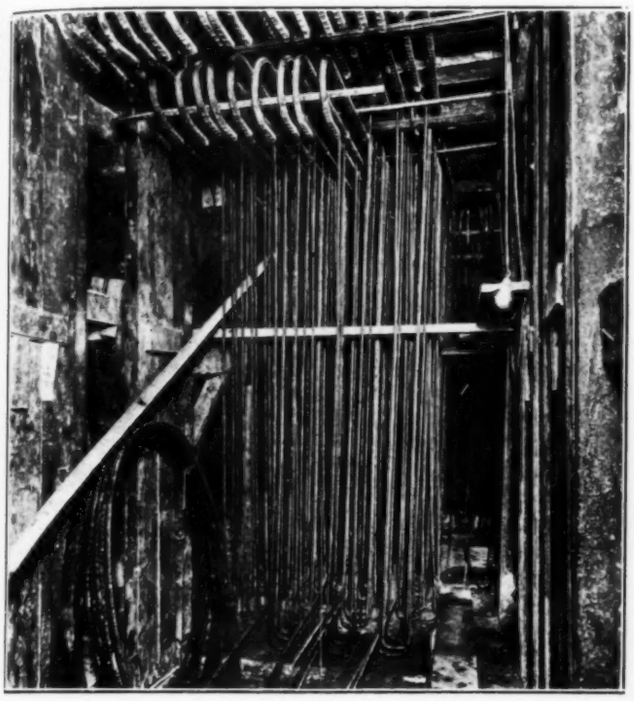
The present *Tribune* plant is a seven-story structure that is set back from Michigan Avenue. It is in front of this structure that the new building is to rise to a height of 450 ft. above the upper Michigan Avenue level. This site is at present partly occupied by a low extension, one story high, with basement, that helps to house the presses. In the case of a daily metropolitan newspaper with a big Sunday circulation it is highly important that the presses be kept in readiness for immediate service.

The chief problem that the foundation contractors have had to face has been due to the fact that the press foundations are soil bearing, that they are connected at the west line of the building to a pile bearing foundation, and in the present extension on caissons to rock. As originally contemplated, the caissons and press framing in the extension were not to be dis-

GENERAL VIEW OF THE FOUNDATIONS FOR CHICAGO TRIBUNE'S NEW BUILDING

turbed, but in developing foundations for the new building it was found necessary to cut 15-ft. sections out of six of these caissons in order to place reinforced concrete distributing girders for the new column supports.

It also was necessary to shore the front row of



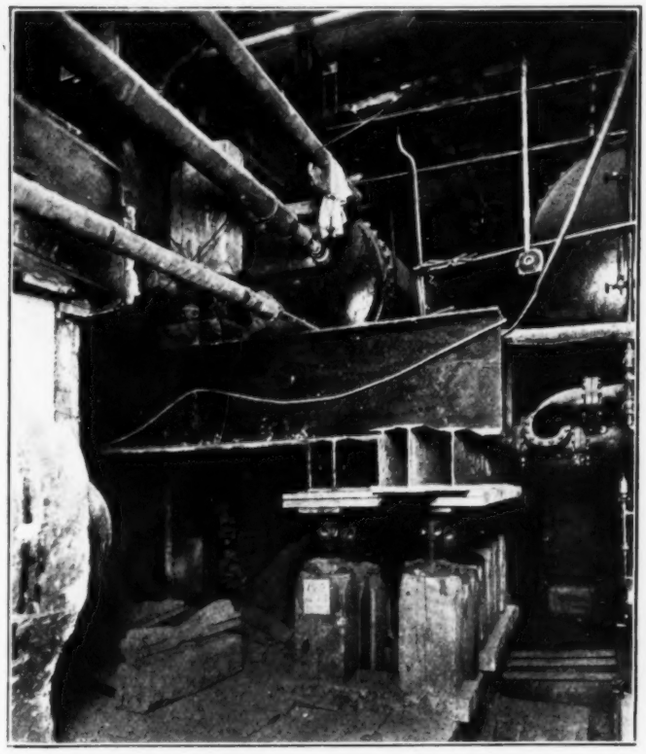
REINFORCING STEEL PLACED IN TRENCH PREPARED FOR DISTRIBUTING GIRDER

columns for the seven-story plant, inasmuch as the caissons that were excavated under these columns will support the front of the plant building and the rear of the new tower building.

When alignment readings were taken on the presses, it developed that there was a tendency to move south. It was found necessary to put spur braces of 16 in. by 16 in. timbers on 16-ft. centers, built up with eight 25-ton jacks, in order to maintain the presses in alignment. A stress of approximately 200 tons per bearing point was thus developed. Two engineers were required all of the time to take level readings; these were taken to 1/1000 of a foot.

The concrete distributing girders required beneath the pressroom a trench 10 ft. wide and 35 ft. from grade to the bottom. This was made necessary for the purpose of utilizing the caissons already in place in conjunction with the new ones through the medium of a concrete distributing girder 100 ft. long. For this construction the workmen cut into the side of the caissons below the bottom of the girder and supported steel beams, properly shimmed up, in the niche that was thus formed. They then went above what would be the top of the girder and cut in, and then at the ends of the beams they placed wooden struts that were driven into place after the two sets of beams had been jacked apart in order to take up the deflection. The sides of the trench were held in place by vertical steel walers that were of sufficient strength to carry the earth pressure to horizontal struts above and below the girder, the entire operation entirely clearing the girder of shoring of any description and allowing all reinforcing rods and stirrups to be placed in correct location.

Naturally, in preparing the space required for this enormous girder, great dependence was placed on the compressed hammer. Without it the work would have been long drawn out and exceedingly laborious, for the caissons were of highly substantial concrete. However, with the air hammers pounding away, fol-



INTRICATE METHOD USED FOR SHORING COLUMNS

lowed by the use of the plug and feather method, the sturdy caissons seemed to melt away and were rapidly trimmed out in good shape.

The R. C. Wieboldt Company, Chicago, are the foundation contractors, and the L. P. Friestedt Company, Chicago, are the shoring contractors. The work that they will do will bring the building to the Michigan Avenue level.

SUCCESSFUL METHODS

A Magazine of Construction Service sent free of charge to men engaged in construction

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SAND CLAY AND CLAY GRAVEL

Combination Surfacing Section Will Be Used on Georgia Highways

By Fred. M. Garnett
Office Engineer, Georgia Highway Department

THE Georgia State Highway Department has recently approved and adopted a standard sand clay, and clay gravel surfacing section, consisting of a sand clay or top soil base, 18 ft. wide and 5 in. thick, over which there is 4 in. of clay gravel required. Referring to the typical section shown herewith, it will be seen that the above measurements are compacted measurements. It is believed that a combination section of this kind will prove an ideal one to use in some sections of the State. Surfacing of this type is economical; moreover, it should give gratifying results, as viewed from point of service anticipated. This type of section lies between a sand clay section and a gravel section—a mid-point, so to speak, and yet possesses the characteristic qualities of each.

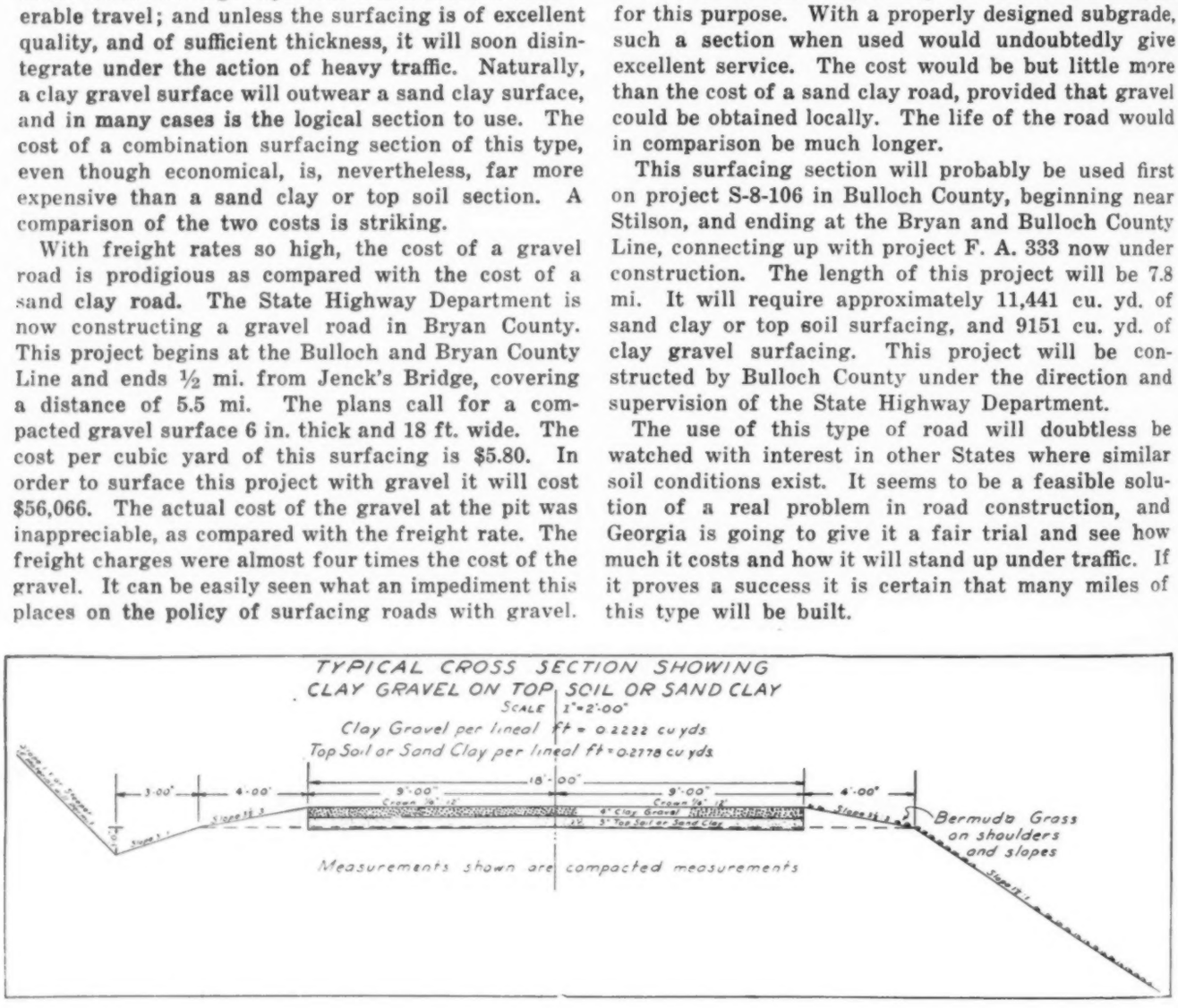
It has long been observed that a sand clay surface is not suited for highways over which there is considerable travel; and unless the surfacing is of excellent quality, and of sufficient thickness, it will soon disintegrate under the action of heavy traffic. Naturally, a clay gravel surface will outwear a sand clay surface, and in many cases is the logical section to use. The cost of a combination surfacing section of this type, even though economical, is, nevertheless, far more expensive than a sand clay or top soil section. A comparison of the two costs is striking.

With freight rates so high, the cost of a gravel road is prodigious as compared with the cost of a sand clay road. The State Highway Department is now constructing a gravel road in Bryan County. This project begins at the Bulloch and Bryan County Line and ends ½ mi. from Jenck's Bridge, covering a distance of 5.5 mi. The plans call for a compacted gravel surface 6 in. thick and 18 ft. wide. The cost per cubic yard of this surfacing is $5.80. In order to surface this project with gravel it will cost $56,066. The actual cost of the gravel at the pit was inappreciable, as compared with the freight rate. The freight charges were almost four times the cost of the gravel. It can be easily seen what an impediment this places on the policy of surfacing roads with gravel. In order to avoid as much as possible the prohibitory freight charges, the section shown will be used quite extensively.

There are any number of small gravel pits throughout Georgia. These pits are not large enough or of any significance for commercial purposes. It would not pay to exploit them commercially, but they are, nevertheless, of value for local use and serve a need in surfacing roads. The combination surfacing section shown was designed primarily for use on a highway where gravel exists locally. And since the quantity of gravel required is small in comparison with a section composed wholly of gravel, the material existing locally is used. The sand clay base underlying the gravel can be readily obtained from pits in proximity to the proposed highway. There is usually an abundance of sand clay or top soil material available for this purpose. With a properly designed subgrade, such a section when used would undoubtedly give excellent service. The cost would be but little more than the cost of a sand clay road, provided that gravel could be obtained locally. The life of the road would in comparison be much longer.

This surfacing section will probably be used first on project S-8-106 in Bulloch County, beginning near Stilson, and ending at the Bryan and Bulloch County Line, connecting up with project F. A. 333 now under construction. The length of this project will be 7.8 mi. It will require approximately 11,441 cu. yd. of sand clay or top soil surfacing, and 9151 cu. yd. of clay gravel surfacing. This project will be constructed by Bulloch County under the direction and supervision of the State Highway Department.

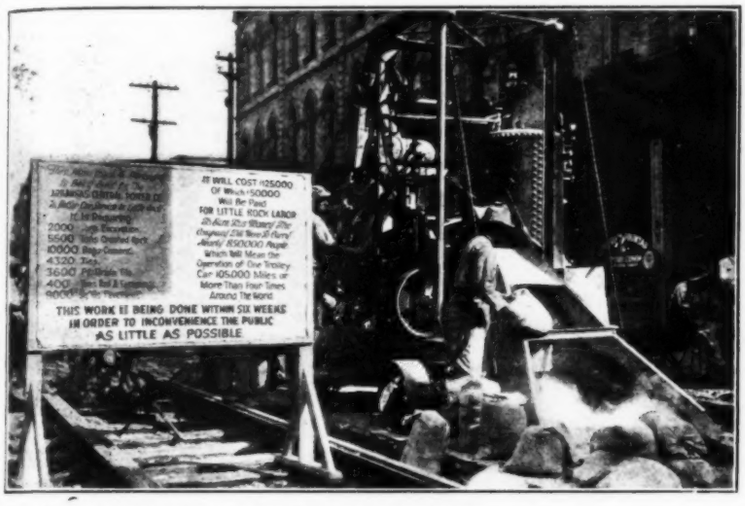
The use of this type of road will doubtless be watched with interest in other States where similar soil conditions exist. It seems to be a feasible solution of a real problem in road construction, and Georgia is going to give it a fair trial and see how much it costs and how it will stand up under traffic. If it proves a success it is certain that many miles of this type will be built.



ALL CARDS ON THE TABLE

Street Car Company Tells Public Why Streets Are Torn Up

THE "public be damned" theory that is attributed to a great railroad builder has been reversed by the Arkansas Central Power Company of Little Rock in the matter of street car track improvements. Furthermore, the officials of the company have made the most of their opportunity to win the good-will of the public at a time when the public was suffering inconvenience from the fact that streets were torn up. They have put up signs telling exactly what is going on.


IT WILL COST #25000
FOR LITTLE ROCK LABOR
THIS WORK IS BEING DONE WITHIN SIX WEEKS
IN ORDER TO INCONVENIENCE THE PUBLIC
AS LITTLE AS POSSIBLE

THIS SIGN KEEPS CLOSE TO THE MIXER

One of these signs told the public in big letters—"This work is being done within Six Weeks in order to Inconvenience the Public as Little as Possible." Emphasis is also placed on the fact that $50,000 will be paid for Little Rock labor. The materials required and the quantities are also listed, so that the public will have a definite idea of the extent of the undertaking. This sign was on the West Markham Street job.

On the East Fourteenth Street job, the year's work was summarized in this manner: "When this job is finished it will complete the work this company has been doing in the last year to improve the street car tracks and pavements and which has cost $275,000. This includes relaying of four miles of tracks and repaving of one-third of all the pavement between our tracks in Little Rock."

The Markham Street job was started Aug. 14 and completed the night of Sept. 22. It consisted of the removal of one mile of double track and two blocks of single track, including the rails and ties, removal of pavement and concrete foundation under the track, excavation, reballasting and relaying of track, putting in of concrete foundation between the rails and for 2 ft. on the outside thereof and paving between the track and on the outside thereof with Warrenite.

Traffic was continued without interruption by abandoning one track at a time. The city made the street a one-way street and traffic was open at all times and no cross streets were blocked for more than two hours at a time. The street car company paid for the extra traffic policemen required.

The East Fourteenth Street job consisted of the removal of 3500 ft. of track, excavation and reballasting and paving with concrete between tracks and for two feet on the outside. This portion of the track was practically at the end of the line and traffic over that part being rebuilt was abandoned for two weeks; during this time the work was finished. In the meantime service was maintained by motor buses on streets parallel and one block from the street car line.

ARKANSAS CENTRAL POWER CO.
To Better Car Service in Little Rock
2000 Tons Excavation
2100 Tons Crushed Rock
1500 Bags Cement
1650 Ties
115 Tons Rail & Fastenings
4100 Sq. Yds. Pavement
WHEN THIS JOB IS FINISHED IT WILL COMPLETE THE WORK THIS COMPANY HAS BEEN DOING IN THE LAST YEAR TO IMPROVE THE STREET CAR TRACKS AND PAVEMENTS AND WHICH HAS COST #275,000 THIS INCLUDES RELAYING OF FOUR MILES OF TRACKS AND REPAVING OF ONE THIRD OF ALL THE PAVEMENT BETWEEN OUR TRACKS IN LITTLE ROCK.

ALL THE FACTS AND FIGURES ARE OPEN TO THE PUBLIC

American Road Builders' Association Convention and Road Show, Chicago, Ill.

JANUARY 14-18, 1924 ARE YOU GOING?

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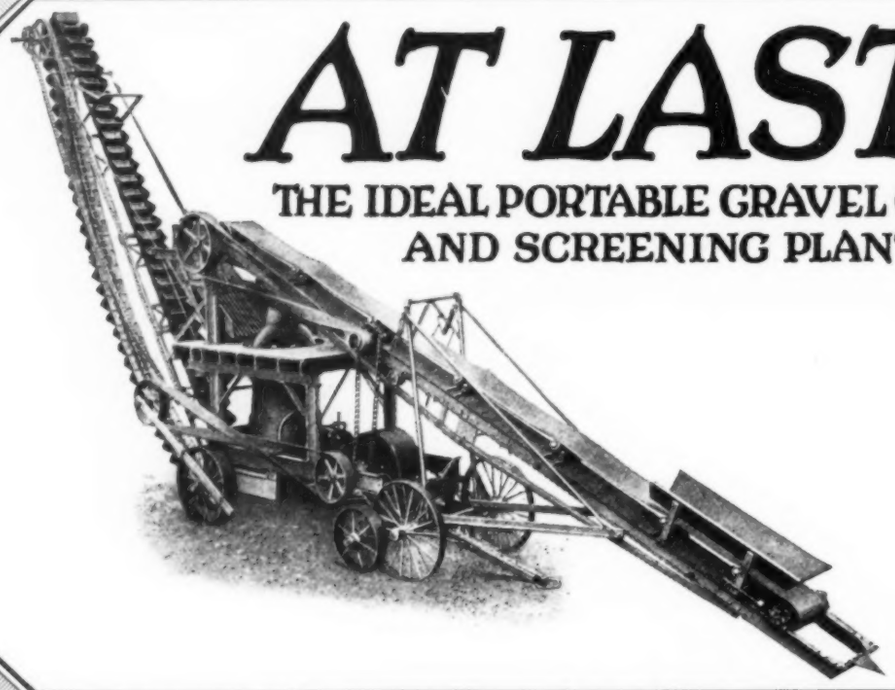
THE IDEAL PORTABLE GRAVEL CRUSHING AND SCREENING PLANT



GRAVEL is brought from the pit in wagons, drags or fresnos, and dumped through a trap directly upon the conveyor, which in turn deposits the material upon a grizzly screen. The undersized material drops through the bars of the grizzly upon a chute leading directly to the elevator, while the oversize rolls down the bars into the crusher.

Nos. 2, 3 and 4 Austin Gyratory Crushers can be mounted on trucks and furnished with rigid or folding elevators of the required lengths, and gravel conveyors ranging in length from 30 feet to 50 feet. Optional equipment includes a revolving screen mounted on a portable bin.

While moving from place to place, the elevator folds down over the crusher; the conveyor is disconnected from the crusher, and its lower end attached to a truck or wagon.

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